Abstract

The use of doped or undoped rare-earth silicates, according to the formula MSi_xO_y wherein M is a rare-earth element, in semiconductor technology is disclosed. In particular, gadolinium silicate as a gate dielectric of a metal-insulating-semiconductor device is disclosed. The insulator of the metal-insulating-semiconductor device is fabricated by exposing a suitably cleaned and terminated surface of a semiconductor substrate to a simultaneous or sequential flux of rare-earth atoms, silicon atoms and oxygen atoms, and annealing the resulting rare-earth containing layer. The use of higher dielectric constant material, such as provided by the invention, reduces the tunneling current through the device, since layers of greater thickness can be used.